ATOMIC ENERGY Letter

THE FIRST AND ONLY AT

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Dear Sir:

President Truman last week at Groton, Conn., dedicated the Nautilus, the world's first submarine which will be powered by nuclear energy. At these keel laying ceremonies, President Truman commented on the prototype hull which has been constructed at the Reactor Testing Station, Arco, Idaho. He observed that the nuclear power plant, for this prototype hull, is nearing the point where the reactor may go into operation. When the "bugs" are ironed out of this land-based prototype, the Nautilus will then be equipped with this perfected nuclear power plant, which Truman estimated will give the submarine an underwater speed of "more than twenty knots".

The stockpiling of "thousands" of hydrogen bombs was urged last week by Senator Brien McMahon, during the course of an address to the Democratic State convention, assembled in Hartford, Conn. Senator McMahon is Chairman of the Joint Senate-House Committee on Atomic Energy, the agency controlling the destiny of the United States' atomic energy program. This was an admission that development of the fusion (hydrogen) bomb has progressed to the point where its assembly is feasible. (Of course, construction has been underway for some time now on the plant to produce the hydrogen bomb--the DuPont-Savannah River operation of the USAEC--but this was the first indication from a responsible official that a hydrogen bomb is practicable. Data assembled during the just-concluded nuclear detonations at the Yucca Flat, Nev., atomic weapon proving ground has materially contributed to fusion bomb work.)

Australia's uranium fields will be discussed by Prime Minister Robert Menzies when he visits the United States, on his way home from England, where he now is. The discussions will involve the Combined Development Agency, a joint United States-British group that handles the supply of fissionable ores. Assisting him in the talks will be the heads of Australia's Development Department and Supply Department. Before Mr. Menzies left Australia, his government agreed to sell Australia's entire output of uranium ore over and above its own needs to the Combined Development Agency. Mr. Menzies commented on the recently discovered Rum Jungle uranium deposits south of Darwin. (This LETTER said June 3rd that these deposits were extensive but had to be explored in depth before deciding the scale on which they could be worked.) Mr. Menzies said of Rum Jungle "that they exist is beyond doubt but their development is a great problem".

The Spring series of tests, of nuclear devices (weapon prototypes) held by the USAEC at its Yucca Flat (Nev.) proving ground have been concluded. The final detonation, in the last fortnight, was a tower blast. Carroll L. Tyler, the USAEC's manager for this operation, said that the tests, like the two preceding series, have "significantly helped the nation's atomic weapons position". Four of the nuclear devices were set off from steel towers at the proving ground; four were dropped from aircraft. Troops participated in some of the tests, practicing to take control of territory under atomic attack.

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RAW MATERIALS...radioactive minerals for nuclear applications...

UNITED STATES: A new ore buying depot has now been established near Grants, New Mexico, for the purchase of various types of uranium-bearing ores. The depot, owned by Anaconda Copper Mining Co., will be the first to provide a market for the limestone gangue ores of the Grants area. Amenable ore of this type will be treated in the processing plant now under construction by Anaconda at this same site. Limestone gangue ores, carnotite-type or roscoelite-type ores, and other types, will be purchased on terms that will, of course, depend upon the metallurgical characteristics of the ores. It is expected that the new purchasing depot will stimulate the development and production of uranium-bearing ores in the Grants area, where uranium was first discovered in the Summer of 1950.

CANADA: American-Canadian Uranium Co., Ltd., headed by Paul V. McNutt, New York, is launching an exploration program this month on its large acreage in the Athabaska area of Northern Saskatchewan. The work will include detailed re-prospecting of certain sections of the company's ground that has been subjected to only preliminary work, in addition to diamond drilling of several showings of promise. New financing, on a rather substantial scale, is now underway, and it is expected to result in an intensive exploration program.....An exploration party in the employ of Nesbitt LaBine Uranium Mines has made what is described as a new and impressive discovery of pitchblende on newly staked ground some miles from the company's main properties, President Gilbert A. LaBine recently told the first annual meeting of shareholders. The find, which was made by director John Nesbitt, consists of 12 new occurrences, under favorable conditions, in a brand new area which Mr. Nesbitt believes to be of considerable promise. At the company's A.B.C. group, an early start will be made to explore what was termed "an important orebody". Mr. LaBine described it as the most impressive in the western hemisphere, outside of the original Eldorado find he made at Great Bear Lake. The company was reported to be amply financed for its program, with expectations that it will be ready to ship ore to Eldorado's new custom mill when that unit goes into operation about the end of next March.....Diamond drilling crews are working 24-hours a day at Beaver Lodge Uranium Mines, Uranium City, Saskatchewan. The No. 3 vein is reported as the most responsive to exploration thus far. It has been exposed by trenching for 1,200-ft., and indicates high radioactivity. On the No. 7A vein, a sample across 30-ins. has assayed 1.19% uranium oxide.

INDIA: Small deposits of uranium and thorium minerals have been found in Madras State, from Gangam to Visagapatam, a distance of about sixty miles. This is in the Nellore and Tinnevalley districts.

BUSINESS BRIEFS...in the nuclear field...

NEW POWER SOURCES FOR NUCLEAR PLANT: Fifteen electric power concerns, all in the Ohio River valley, have made commitments to the USAEC to provide upward of 2,200,000 kilowatts of electric energy for a new gaseous diffusion plant for the production of uranium-235, it was revealed at the twentieth annual convention of the Edison Electric Institute held in Cleveland recently. The plans for this project envisage it as one of the most comprehensive undertakings in the history of the electric light and power industry, utility executives indicated. The new uranium-235 plant, which is expected to be in southern Ohio, will be patterned along the lines of the USAEC's development in Paducah, Ky.

INDUSTRIAL ATOMIC POWER: Private enterprise has been disappointingly slow in providing leadership for the development of atomic power, an alumni forum on atomic energy at Stevens Institute of Technology was recently told by Dr. Karl Cohen, vice president and research director of the Walter Kidde Nuclear Laboratories of New York. Dr. Cohen, who has been intimately associated with the development of atomic energy in the U.S. since his work at the inception of the uranium-235 plant at Oak Ridge, Tenn., complained of a systematic belittling of the industrial side of the atom. This is being done, he said, by an influential school of opinion which had hoped that this would clear the way for restricting atomic weapons. Far more development could be made even within the framework of existing Government controls, Dr. Cohen stated. Another speaker at the forum, Dr. Lloyd V. Berkner, director of Brookhaven National Laboratory, L.I., urged moderate Government subsidies for atomic power development, such as those that helped build up the commercial airlines.

RADIOISOTOPES...applications and notes...

NEW CHARGES FOR RADIOISOTOPES: Starting next month, the USAEC will charge 20% of production costs for radioisotopes to be used in the study, diagnosis, or treatment of cancer. Since 1948, radioisotopes used for this purpose have been furnished free of any production costs; only transportation and handling costs have been charged for. More than $1,400,000 worth of radioisotopes have been distributed since the inception of the program, which was established to provide a stimulus for exploration of methods of using radioisotopes against cancer. The field has developed so rapidly that certain clinical applications of radioisotopes now have become a matter of routine, and research workers have become fully aware of the usefulness of radioisotopes in cancer research. For that reason the USAEC feels that the stimulus of completely free distribution no longer is necessary to encourage the use of radioisotopes in the field of cancer. A comparison of the costs of four radioisotopes when for cancer uses, with their costs when used for other purposes, shows radioiodine-131 to be 15¢/mc for cancer use; 75¢/mc for non-cancer use, while radiophosphorous-32 is 22¢/mc against $1.10/mc and radiogold-198 is 5¢/mc against 24¢/mc. (Recent developments in the USAEC cancer program include the establishment of cancer hospitals at the Oak Ridge Institute of Nuclear Studies and Argonne National Laboratory and experimental work on cancer in the hospital at Brookhaven National Laboratory.)

RADIOIODINE USED ORALLY: Radioiodine, administered orally, has been used with some success in the treatment of over activity of the thyroid gland, a group of University of Chicago surgeons reported last week at the closing sessions of the annual meeting of the American Medical Association in Chicago. Three quarters of the patients required only one or two treatments to obtain remission of the thyroid malfunction. The successful cases experienced from six months to five years relief before the trouble recurred. The investigators, Drs. Dwight E. Clark, and James H. Rule, and Otto H. Trippel and David A. Coffrin, feel that radioiodine is an acceptable substance for treating certain cases of thyroid overactivity.

RADIOISOTOPE USES DESCRIBED: Medical advances made possible through the use of radioisotopes were recently described by Frank A. Howard, president of the Sloan-Kettering Institute for Cancer Research, who addressed an alumni forum on atomic energy at Stevens Institute of Technology (Hoboken) last fortnight. Some of these applications of radioisotopes described by Howard included: Measurement of a patient's blood quickly and accurately by radioiodine or radiophosphorous to see how much of the body's normal six quarts may have been lost and must be made up by transfusion. A sample of blood is treated with the isotope, re-injected into the bloodstream, and allowed to spread so that the dilution in a new sample quickly gives a reading. Another application described was the study of the mechanism of digitalis. In this case, the foxglove plant, from which the drug is derived, is grown in an atmosphere in which carbon dioxide is made with radioactive carbon, so that the plant picks up the tracer. Still another instance cited was the work of Dr. David Pressman, of Sloan-Kettering, in the use of radioactive materials to strengthen antibodies to fight invading proteins. Thus far, kidney, lung and liver tissues from laboratory rats and mice have been injected into rabbits to produce antibodies, which are then combined with radioiodine or radiosulphur. The radioactive serum, reinjected into the rats, concentrates in the proper tissues.

RADIOACTIVE DRUG PLANTS: Radioactive drug plants, such as foxglove, from which digitalis is extracted, (as above) were recently shown by a University of Chicago research teams at the American Medical Association meeting Chicago. The plants contain minute amounts of radioactivity which allows the action of the drugs produced from them to be traced in both human beings and experimental animals. In the method, developed by a group headed by Dr. E. M. K. Geiling, the plants are grown in a glass chamber into which radioactive carbon-14 and plant foods are introduced. The carbon-14 is in the form of carbon dioxide gas. Digitoxin, important heart stimulant, has been made radioactive by this method. At the University, radioactive drug plants such as opium, belladona, nicotine, and marijuana are being grown in order that more may be learned about the action of the drugs made from these plants.

ATOMIC PATENT DIGEST...latest U. S. patents and applications...

Thermal neutron detector element. In part, an article having a base coat containing a thermal neutron-reactive element unenriched with respect to the thermal neutron-reactive isotope and a surface coat in intimate contact therewith containing this thermal neutron-reactive element enriched with respect to this neutron-reactive isotope. U. S. Pat. No. 2,599,156 issued June 3, 1952; assigned to United States of America (USAEC).

Method of identifying the radioactive components of a composition. Comprises, in part, adding to the composition known isotopes having known half-lives, ionizing the combination of the composition and the known isotopes, separating the ions into groups having different mass-to-charges ratios, collecting each group individually upon a non-radioactive adhering collector, and measuring at known time intervals the radioactivity of the material deposited by each group upon the collector plate. In this manner, the chemical elements that constitute each group of common mass number may be determined by the characteristics of the radioactive decay of the group. U S. Pat. No. 2,599,166 issued June 3, 1952; assigned to United States of America (USAEC).

Pulse type transformer. Comprises, in part, a primary winding having a plurality of continuous mutually insulated conductors aligned transversely to the direction of continuity, a secondary winding having a pair of insulated, parallel-connected, strap conductors extended as a spiral and interleaved, one on each side of the primary conductors. U. S. Pat. No. 2,599,182 issued June 3, 1952; assigned to United States of America (USAEC).

Magnetic peeler for proton synchrotron. An apparatus for changing the trajectory of high energy ions moving in a curvilinear path in a magnetic field in order to eject these ions from this field. Comprises an elongated magnetic metal member having a longitudinal channel in it, means for moving this channel in the magnetic field toward and away from the curvilinear path, and for keeping this channel aligned with the path. U. S. Pat. No. 2,599,188 issued June 3, 1952; assigned to United States of America (USAEC).

Preparation of aluminum borohydride.. In part, a process of preparing aluminum borohydride which comprises reacting an alkali metal borohydride with an aluminum halide to form aluminum borohydride. U. S. Pat. No. 2,599,203 issued June 3, 1952; assigned to United States of America (USAEC).

Decomposition of complex metal phosphate salts. In part, the method of recovering titanium sub group metal values from a phosphorous oxychloride complex of said metal. Comprises reacting this complex with a monohydric alcohol containing less than five carbon atoms, dissolving this reaction mass in water, introducing a source of hydroxyl ions into the solution whereby the titanium subgroup metal is precipitated as the hydroxide, and recovering the precipitate. U S. Pat. No. 2,599,326 issued June 3, 1952; assigned to United States of America (USAEC).

Oxidation inhibitors of uranium oxide. An oxidation-resistant composition comprising an oxide of uranium, wherein the valence of the uranium atoms is less than 6 and at least 0.1% by weight, based upon uranium content, of iron as iron oxide. U. S. Pat. No. 2,599,946 issued June 10, 1952; assigned to United States of America (USAEC).

Monitoring of gas for radioactivity. An ionization chamber for use in measuring beta ray activity of a gas passing therethrough. U. S. Pat. No. 2,599,922 issued June 10, 1952; assigned to United States of America (USAEC).

NOTES:- Disclaimer has now been filed by the Radio Corp. of America, assignee of U. S. Pat. No. 2,517,120, titled "Methods of and Means for Collecting Electrical Energy of Nuclear Reactions", to claims 1, 3, 4, 5, 7, and 8 of this patent.

Sub-licenses will now be granted by the Markite Company, 155 Waverly Place, New York 14, under the following patent: U. S. Pat. No. 2,573,639. Manufacture of porous articles from trifluorochloroethylene polymer. Under the teachings of the patent, the finely divided powder of the polymer is cold-molded at a pressure greater than 500 pounds per sq. in., and after removing from the mold, is sintered at a temperature not in excess of 250 deg. C.

NEW PRODUCTS, PROCESSES & INSTRUMENTS...for nuclear work...

Shoulder-length rubber gloves, which fit either hand, have now been developed for hazardous radioactive biological and chemical research work in hermetically sealed dryboxes. The glove is designed with a "neutral" thumb which permits the use of either hand in any of the drybox armpits. It is made of highly flexible thin gauge neoprene (fifteen thousands of an inch, including tolerances) which provides touch sensitivity, hand comfort, and dexterity. At the same time the thin film is non-porous, and provides full protection against contamination. When used in the drybox, the gloves are sealed around the arm ports for protection of the user's arms and hands; the gloves are 38-inches long, and weigh less than 6-ounces. --Dewy & Almy Chemical Co., Cambridge, Mass.

New, single, all-purpose instrument for the measurement of radiation is called the Omniometer. It may be employed with all types of sensing elements which are now in general use such as Geiger, proportional and scintillation counters. The circuit of the Omniometer is unique in these features: It incorporates two high voltage supplies which provide overlapping voltage ranges from 500-to 5000-volts. Changeover can be accomplished by a simple switch. If the sensing elements deliver ¼-volt pulses or higher, then access is direct to the scaling circuit. For counting apparatus delivering voltage pulses of smaller magnitude, the pulses are fed into the amplifier input, and then to the scaler. This scaler has a variable scaling factor of 64,128,256, and 512 which enables the user to utilize high counting rates and "fast" detectors. The counting switch automatically actuates a built-in timer which gives the time interval necessary to accumulate the desired number of counts. --Radiation Counter Laboratories, Skokie, Ill.

NOTES: A new price list and supplement to its catalogue of instruments for nulcear research has now been issued by Atomic Instrument Co., Cambridge 39, Mass.

BOOKS, PUBLICATIONS & FILMS...on nuclear subjects...

The following group of recently released films on the radioisotope are available on loan from Army Signal Corps Film Libraries at all Army Area headquarters and from the Isotopes Division, USAEC, Oak Ridge, Tenn. They also may be purchased from United World Films, Inc., 1445 Park Ave., New York 29, N.Y. These films include:

(1) Fundamentals of Radioactivity; 79-minutes. Explains what radioactive isotopes are, how they are produced in the nuclear reactor, and what their properties and characteristics are.

(2) Practical Procedures of Measurement; 33-minutes. This film covers the principles and uses of various types of instrumentation with emphasis being given to the Geiger-Muller counter. Topics such as threshold value, plateau, and counting statistics are included.

(3) Methodology; 40-minutes. Deals with such criteria for setting up a tracer experiment as:- (a) radiochemical purity; (b) single chemical state; (c) elimination of exchange error; (d) knowledge of the degree to which the labeled molecules remain intact; (e) avoidance of isotope effect; (f) avoidance of chemical and radiation effects.

(4) Practice of Radiological Safety; 33 minutes. Handling radioisotope shipments, laboratory design, use of shielding, measurement of personnel exposure; and other factors.

(5) Agricultural Research; 50-minutes. Covers three classes of work: (a) Use of a high energy, beta-emitting radioisotope, such as phosphorous-32, in large-scale field tests of fertilizers; (b) Use of radioisotopes such as cobalt-60 in micronutrient studies with large domestic animals; and (c) Use of low energy beta emitters such as calcium-45, in major nutrient problems and autoradiography.

(6) General Science; 46-minutes. The radioisotope is shown to be a research tool, with 8 experiments illustrating how the radioisotope can be used in metallurgy, chemistry, biochemistry, and plant physiology. The experiments include: self diffusion of solid copper; study of vapor pressure over metallic silver; exchange of chloride ions in solid and liquid; and others.

Sincerely,

The Staff,
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